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TECHNICAL SPECIFICATION

**Digital cellular telecommunications system (Phase 2+) (GSM);
Base Station Controller - Base Transceiver Station (BSC - BTS)
interface;
General aspects
(3GPP TS 48.051 version 16.0.0 Release 16)**



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Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

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where:

- x the first digit:
 - 1 presented to TSG for information;
 - 2 presented to TSG for approval;
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- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
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1 Scope

The present document is an introduction to the 48.5xx - 48.6xx series of 3GPP Technical Specifications and deals with the definition of the Base Station Controller (BSC) to Base Transceiver Station (BTS) interface defined inside the Base Station System (BSS) for the GSM system. These Technical Specifications define the basic interface with some identified options requiring further elaboration. The BSC-BTS interface is mandatory within GSM only if the BSC and the BTS are not colocated.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

- [1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [2] 3GPP TS 43.050: "Transmission planning aspects of the speech service in the GSM Public Land Mobile Network (PLMN) system".
- [3] 3GPP TS 48.008: "Mobile Switching Centre - Base Station System (MSC-BSS) interface; Layer 3 specification".
- [4] Void.
- [5] 3GPP TS 48.052: "Base Station Controller - Base Transceiver Station (BSC - BTS) interface; Interface principles".
- [6] 3GPP TS 48.054: "Base Station Controller - Base Transceiver Station (BSC - BTS) interface Layer 1 structure of physical circuits".
- [7] 3GPP TS 48.056: "Base Station Controller - Base Transceiver Station (BSC - BTS) interface; Layer 2 specification".
- [8] 3GPP TS 48.058: "Base Station Controller - Base Transceiver Station (BSC - BTS) interface; Layer 3 specification".
- [9] 3GPP TS 48.060: "Inband control of remote transcoders and rate adaptors for full rate traffic channels".
- [10] 3GPP TS 48.061: "Inband control of remote transcoders and rate adaptors for half rate traffic channels".
- [11] Void.
- [12] Void.
- [13] Void.
- [14] Void.
- [15] Void.
- [16] Void.
- [17] Void.

[18]	Void.
[19]	Void.
[20]	Void.
[21]	Void.
[22]	Void.
[23]	Void.
[24]	3GPP TS 12.21: "Network Management (NM) procedures and messages on the A-bis interface".
[25]	Void.
[26]	ITU-T Recommendation Q.920: "ISDN user-network interface data link layer - General aspects".
[27]	ITU-T Recommendation Q.921: "ISDN user-network interface - Data link layer specification".

3 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 apply.

4 Interface capabilities

The BSC-BTS interface shall be capable of supporting all the services offered to the GSM users and subscribers. In addition it shall also allow control of the radio equipment and radio frequency allocation in the BTS.

5 Interface specification objectives

The BSC to BTS interface specifications should allow the following:

- (I) Connection of various manufacturers BTS/TRX to the same BSC, according to the location of the transcoder.
- (II) The use of several manufacturers BSC to the same type of BTS/TRX, according to the location of the transcoder.
- (III) The use of the same BTS/TRX in any PLMN, according to the location of the transcoder.
- (IV) The use of the same BSC in any PLMN.
- (V) Separate evolution of BSC and BTS/TRX technology.
- (VI) Separate evolution of O & M facilities.
- (VII) Sub-multiplexing of speech channels on a 64 kbit circuit.
- (VIII) Evolution towards lower speech coding rates.
- (IX) Location of transcoders either in BSC or in BTS.
- (X) Support of all services defined in the 02 series of 3GPP TS Technical Specifications.
- (XI) A stepwise expansion of capacity in a BTS.
- (XII) Different physical solution of the various equipment in the BTS.
- (XIII) Support of a single TRX forming a BTS.
- (XIV) Support of a set of TRX'S forming a BTS.
- (XV) Support of a BTS as one entity.

6 Interface characteristics

The interface is defined to be at the terrestrial link of a remote BTS connected to the BSC.

The BSC to BTS interface is specified by a set of characteristics, including:

- a) physical and electrical parameters;
- b) channel structures;
- c) signalling transfer procedures;
- d) configuration and control procedures;
- e) operation and maintenance information support.

The definition of the BSC to BTS/TRX interface follows a layered approach similar to the ISDN. Layer 3 is for the most part based on Technical Specification 3GPP TS 48.008 with additional procedures for control of radio resources. Layer 2 is based on the LAPD protocol. Layer 1 is either digital (at a rate 2 048 kbit/s with a frame structure of 32 x 64 kbit/s time slots or at a rate of 64 kbit/s) or analogue with the data being passed by the use of modems (this latter case is a national option).

In the case that the transcoder is positioned outside the BTS, the overall one way propagation delay between the Point of Interconnection to PSTN/ISDN and the MS is limited to 1,5 ms (approximately 300 km). With the transcoder in the BTS, the limit is 6,5 ms (approximately 1 300 km). These limits may be subject to increase resulting from savings made in the overall network. See also Technical Specification 3GPP TS 43.050.

7 Other technical specifications on the BSC-BTS interface

The full structure of the Technical Specifications specifying the BSC to BTS interface are as follows:

7.1 3GPP TS 48.052 BSC-BTS Interface Principles

3GPP TS 48.052 gives the principle basis for the rest of the specifications specifying the interface between the base station controller and the base transceiver station. It gives the functional split between these two entities.

7.2 3GPP TS 48.054 BSC-BTS Layer 1 Specification

3GPP TS 48.054 defines the structure of the physical layer at the BSC - BTS interface. The physical interface is either chosen as 2 048 kbit/s or as 64 kbit/s, both according to standard ITU-T recommendations.

Depending on location of transcoders, speech is standard A-law or it is 16 kbit/s remote control protocol multiplexed or rate adapted to 64 kbit/s in the same way as data.

7.3 3GPP TS 48.056 BSC-BTS Layer 2 Specification

At layer 2 the signalling information is passed by a standard LAPD protocol mechanism in accordance with the ITU-T Recommendations Q.920 and Q.921.

7.4 3GPP TS 48.058 BSC-BTS Layer 3 Specification

3GPP TS 48.058 specifies the layer 3 procedures used on the BSC-BTS interface for control of the GSM services. The functional split between BSC and BTS is defined in Technical Specification 3GPP TS 48.052.

7.5 3GPP TS 12.21 BSC-BTS Operation/Maintenance Signalling

3GPP TS 12.21 defines the transport mechanism for O&M messages over the Abis interface. O&M procedures and messages are defined in 3GPP TS 12 series.

7.6 3GPP TS 48.060 Inband Control of Remote Transcoders and Rate Adaptors

The transcoder is a part of the BSS and may optionally be located outside the BTS (e.g. at MSC-site or at BSC-site) in order to make it possible to multiplex speech and data channels on the links within the BSS and on the BSC-BTS link.

3GPP TS 48.060 describes the protocol which carries the full rate speech and data frames between the transcoder and the radio link codec across a 16 kbit/sec interface. Both full rate speech and full rate data services are covered. It also defines the signals needed for remote controlling the timing of the transcoder in accordance to the transmission time at the radio link. It also addresses the signals for voice activity and comfort noise. It interfaces the 06- series to the 05-series.

7.7 3GPP TS 48.061 Inband Control of Remote Transcoders and Rate Adaptors for Half Rate Traffic Channels

3GPP TS 48.061 describes the protocol which carries the half rate speech and data frames between the transcoder and the radio link codec across a 16 kbit/s or an 8 kbit/s interface. Both half rate speech and half rate data services are covered. It also defines the signals needed for remote controlling the timing of the transcoder in accordance to the transmission time at the radio link. It also addresses the signals for voice activity and comfort noise.

Annex A (informative): Change History

TSG #	TSG Doc.	CR	Rev	Subject/Comment	New
January 2016	-	-	-	Rel-13 version created based on v12.0.0	13.0.0

Change history							
Date	Meeting	TDoc	CR	Rev	Cat	Subject/Comment	New version
2017-03	RP-75					Version for Release 14 (frozen at TSG-75)	14.0.0
2018-06	RP-80	-	-	-	-	Update to Rel-15 version (MCC)	15.0.0
2020-07	RP-88e	-	-	-	-	Upgrade to Rel-16 version without technical change	16.0.0

History

Document history		
V16.0.0	September 2020	Publication